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THE IMMATURE STAGES OF *ATHERIGONA ORIENTALIS* SCHINER (DIPTERA: MUSCIDAE)

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Abstract.—The egg, three larval instars, and puparium of *Atherigona orientalis* Schiner are described. This is the first description of the first and second larval instars of this species.

Atherigona orientalis Schiner, 1868 is widespread in the warmer regions of the world. It is the only species of *Atherigona* known from South America and probably spread there through human commerce. Adults commonly breed in carrion and decaying plant matter, more rarely in feces. Eggs are laid singly and usually inserted in the soft parts of rotting substances, with only the tip of the micropylar end visible (Bohart & Gressitt 1951, Skidmore 1985). Larvae are saprophagous and may also feed on dead or moribund larvae living in the stem. In the latter case, they are scavengers or predators and not parasites (Pont 1972). Pupariation occurs inside the fibrous host material with only the anterior end of the puparium exposed. According to Bohart & Gressitt (1951), *A. orientalis* is an important carrier of fecal and other filth-borne pathogens in Guam. This species infests crops only after a primary infestation has taken place (Pont 1972). Further information on the biology can be found in Rao (1924), Bohart & Gressitt (1951), Pont (1972), and Skidmore (1985).

The morphology of some immature stages (egg, third-instar larva, and puparium) has been described and illustrated by some authors (e.g., Bohart & Gressitt 1951; Skidmore 1985), but the first and second larval instars have never been described (Skidmore 1985). We take this opportunity to describe the first and second instar larvae as well as redescribe the other immature stages so that all can be found in one place.

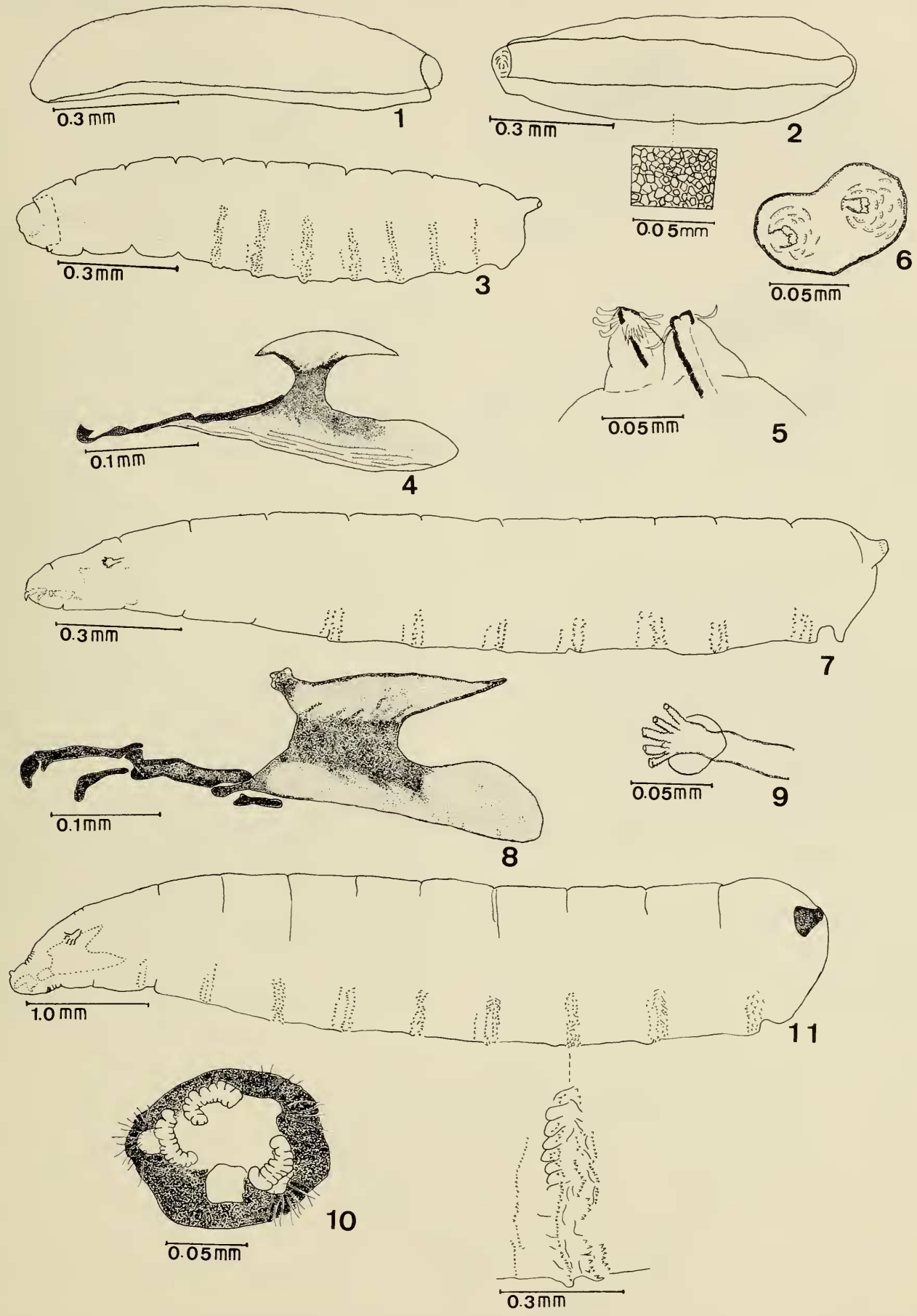
Methods.—Adults of *A. orientalis* were collected in Rio de Janeiro (Horto Botânico, Quinta da Boa Vista, São Cristóvão), Brazil, in 1991 by attracting them to fish bait. A colony was developed inside a glass container in the laboratory. Females oviposited and resulting larvae developed on a small quantity of fruit (banana). After having been cleared in a solution of potassium hydroxide, larvae were studied with a Wild M20 optical microscope.

Description of the Immature Stages of *A. orientalis*

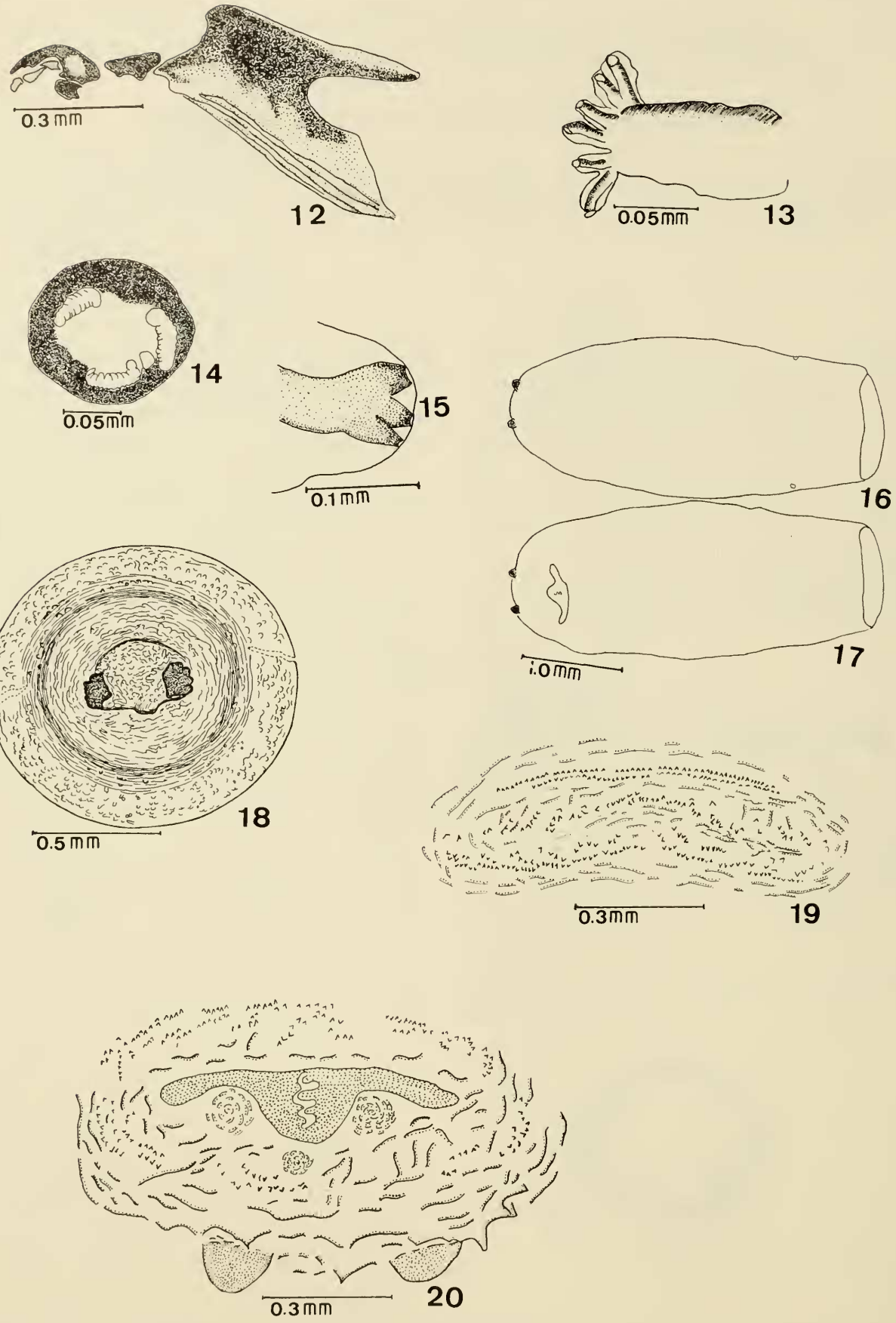
Egg (Figs. 1–2).—Length 1.0 mm. Color white. Dorsal surface ornamented with polygonal pattern. The extremities have narrow, centrolateral projections. These are better seen in profile (Fig. 2). See also Bohart & Gressitt (1951).

First-instar larva (Figs. 3–6).—Anterior spiracles absent. Second to eighth abdominal segments with irregular ventral rows of spines (Fig. 3). Posterior spiracles situated on stalks, with 2 elongate-ovoid slits and are slightly constricted in middle (Figs. 5–6); perispiracular filaments narrow. Cephalopharyngeal skeleton with dorsal horn pointed anteriorly and posteriorly, the pharyngeal constriction narrow, and ventral horn about 1.5 times longer than dorsal one; mouth hooks curved, their extremities pointed (Fig. 4).

Second-instar larva (Figs. 7–10).—Length 2.2–2.5 mm. Anterior spiracle delicate, with about five, finger-shaped projections (Fig. 9). Abdominal segments with spines as in



Figs. 1–11. *Atherigona orientalis*: 1, Egg, dorsal view; 2, Same, lateral view; 3, First-instar larva, lateral view; 4, Cephalopharyngeal skeleton, lateral view; 5, Posterior spiracle of first-instar larva, dorsoblique view; 6, Same, posterior view; 7, Second-instar larva, lateral view; 8, Cephalopharyngeal skeleton, lateral view; 9, Anterior spiracle of second-instar larva, lateral view; 10, Posterior spiracle of second-instar larva, posterior view; 11, Third-instar larva, lateral view.



Figs. 12–20. *Atherigona orientalis*: 12, Cephalopharyngeal skeleton of third-instar larva, lateral view; 13, Anterior spiracle of third-instar larva, lateral view; 14, Posterior spiracle of third-instar larva, posterior view; 15, Same, lateral view; 16, Puparium (without anterior segment), dorsal view; 17, Same, ventral view; 18, Anterior segment of puparium, dorsal view; 19, Same, dorsal view; 20, Posterior segment of puparium, ventral view.

first-instar larva. Posterior spiracles more sclerotized, the 3 spiracular slits "C" shaped (Fig. 10). Cephalopharyngeal skeleton (Fig. 8) with various parts more robust than in first-instar larva; mouth hooks curved.

Third-instar larva (Figs. 11–15).—Length 4.0–6.5 mm. Anterior spiracle with five to seven projections (Fig. 13). Thoracic and abdominal segments with rows of small spines. Posterior spiracular stalks black, the spiracles with three slits similar to those of second-instar larva (Figs. 14–15). Cephalopharyngeal skeleton with sclerites much shorter than in other instars (Fig. 12). See also Skidmore (1985).

Puparium (Figs. 16–20).—Length 3.5–4.0 mm. Segments with rows of spines, more numerous on ventral surface. Anterior abdominal segment ornamented dorsally as in Fig. 18, posterior abdominal segment ornamented dorsally as in Fig. 19. Perianal region with sinuous longitudinal opening and short spines, subanal papillae twice the diameter of the postanal papilla (Fig. 18).

Remarks.—We observed a longer life cycle than has been reported in the literature. Our colony, reared in the laboratory with a median temperature of 28°C and relative humidity of 63%, took 23.5 to 30.0 days from freshly laid egg to eclosion of the adult. The breakdown in the times of the various stages is as follows: egg, 1.0 day; first-instar larva, 0.5–1.0 day; second-instar larva, 1.0–2.0 days; third-instar larva, 9.0–11.0 days; puparium, 12.0–15.0 days. In a review of the literature, Skidmore (1985) reported a range of 11.5 days and Rao (1924 *in* Skidmore 1985) 15.5 days in the cycle from egg through pupariation.

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